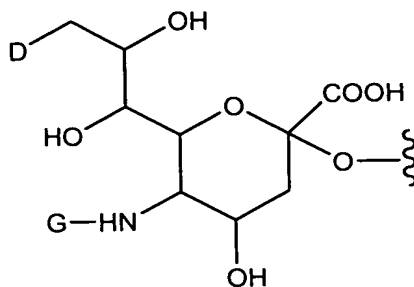


WHAT IS CLAIMED IS:

1. An erythropoietin peptide comprising the moiety:



wherein

D is a member selected from -OH and R^1 -L-NH-;

G is a member selected from R^1 -L- and $-C(O)(C_1-C_6)alkyl$;

R^1 is a moiety comprising a member selected a moiety comprising a straight-chain or branched poly(ethylene glycol) residue; and

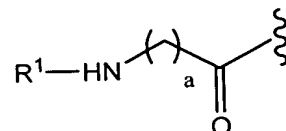
L is a linker which is a member selected from a bond, substituted or

unsubstituted alkyl and substituted or unsubstituted heteroalkyl,

such that when D is OH, G is R^1 -L-, and when G is $-C(O)(C_1-C_6)alkyl$, D is

R^1 -L-NH-.

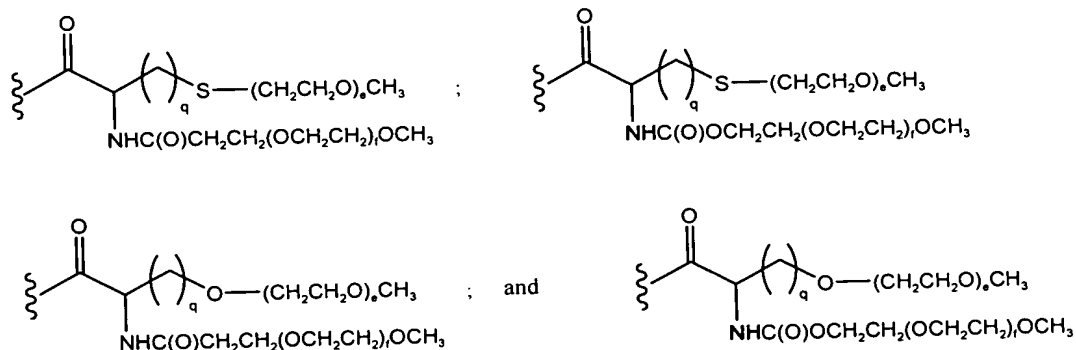
2. The peptide according to claim 1, wherein L- R^1 has the formula:



wherein

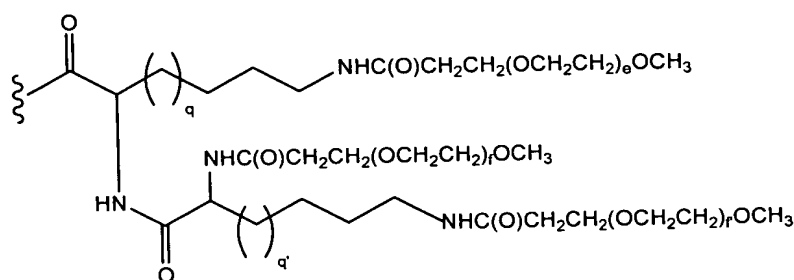
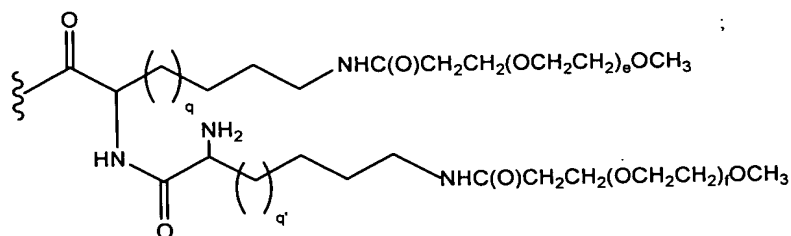
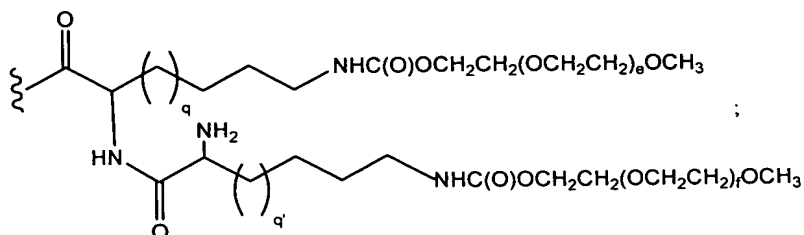
a is an integer from 0 to 20.

3. The peptide according to claim 1, wherein R^1 has a structure that is a member selected from:

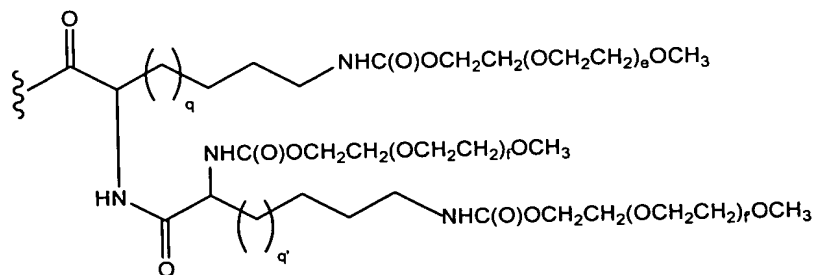


wherein

- 5 e and f are integers independently selected from 1 to 2500; and
 6 q is an integer from 0 to 20.
 1 4. The peptide according to claim 1, wherein R¹ has a structure that is a member
 2 selected from:



; and



3

4

wherein

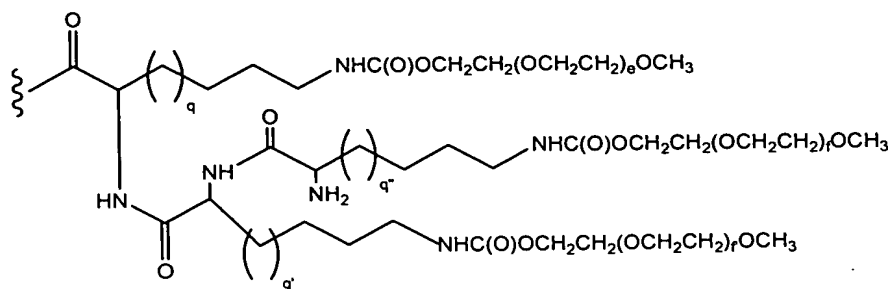
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e, f and f' are integers independently selected from 1 to 2500; and

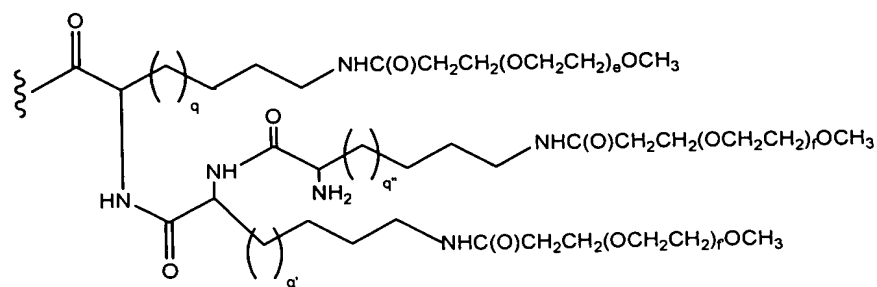
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q and q' are integers independently selected from 1 to 20.

- 1 5. The peptide according to claim 1, wherein R¹ has a structure that is a member
2 selected from:



and

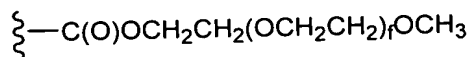
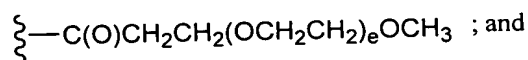


wherein

e, f and f' are integers independently selected from 1 to 2500; and

q, q' and q'' are integers independently selected from 1 to 20.

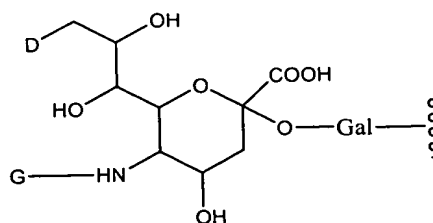
- 1 6. The peptide according to claim 1 wherein R¹ has a structure that is a member
2 selected from:



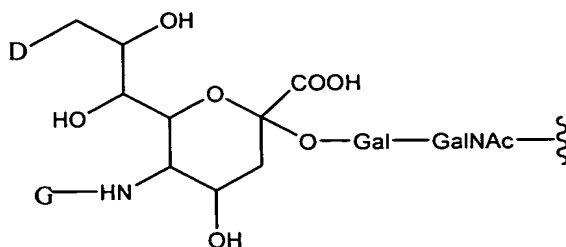
wherein

e and f are integers independently selected from 1 to 2500.

- 1 7. The peptide according to claim 1, wherein said moiety has the formula:

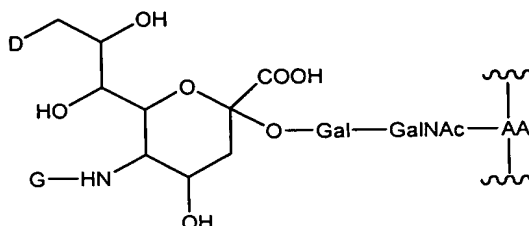


1 8. The peptide according to claim 1, wherein said moiety has the formula:



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1 9. The peptide according to claim 1, wherein said moiety has the formula:



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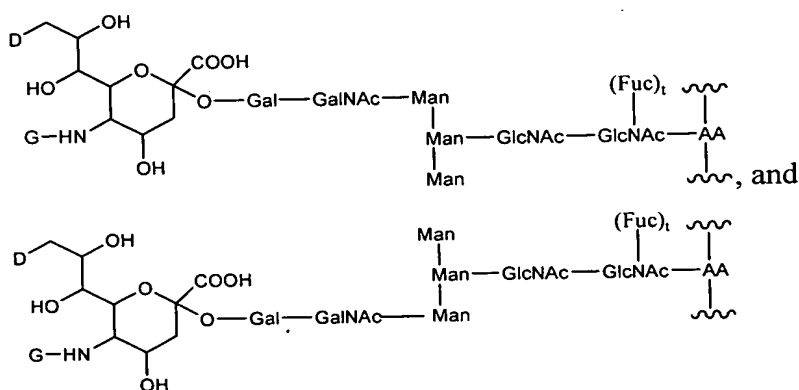
3 wherein AA is an amino acid residue of said peptide.

1 10. The peptide according to claim 9, wherein said amino acid residue is a
2 member selected from serine or threonine.

1 11. The peptide according to claim 10, wherein said peptide has the amino acid
2 sequence of SEQ. ID. NO:1.

1 12. The peptide according to claim 11, wherein said amino acid residue is a serine
2 at position 126 of SEQ. ID. NO:1.

1 13. The peptide according to claim 1, wherein said peptide comprises at least one
2 of said moiety according to a formula selected from:



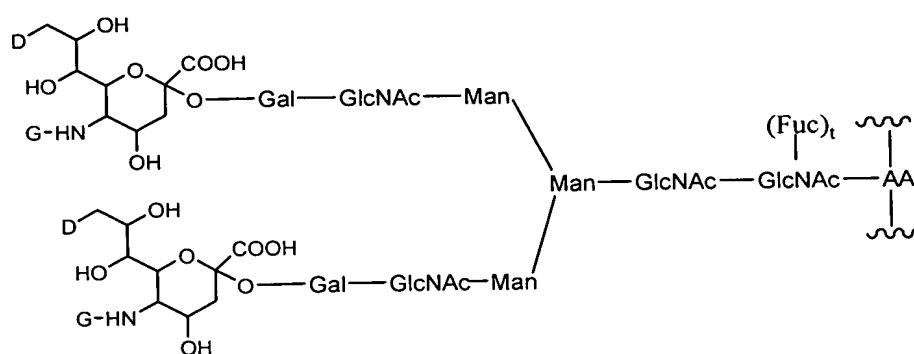
4

5 wherein AA is an amino acid residue of said peptide and t is an integer equal to 0
6 or 1.

1 14. The peptide according to claim 13, wherein said amino acid residue is an
2 asparagine residue.

1 15. The peptide according to claim 14, wherein said peptide has the amino acid
2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine
3 residue which is a member selected from N24, N38, N83, and combinations thereof.

1 16. The peptide according to claim 1 wherein said peptide comprises at least one
2 of said moiety according to the formula:



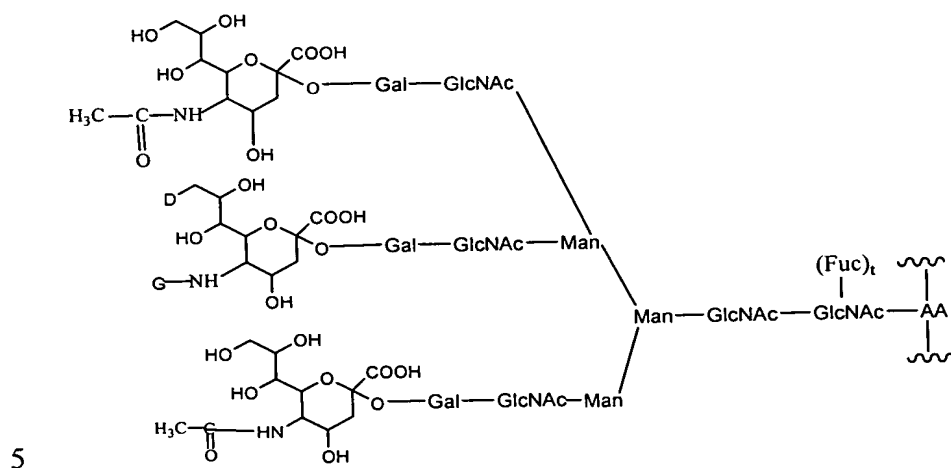
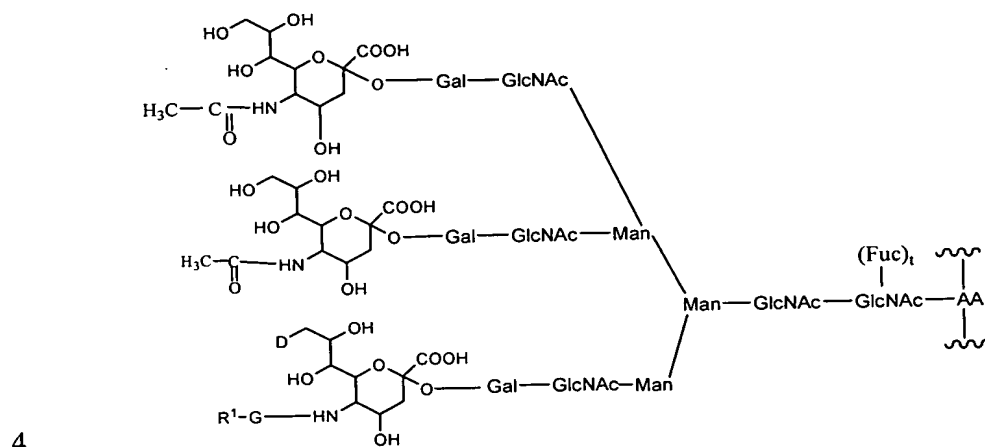
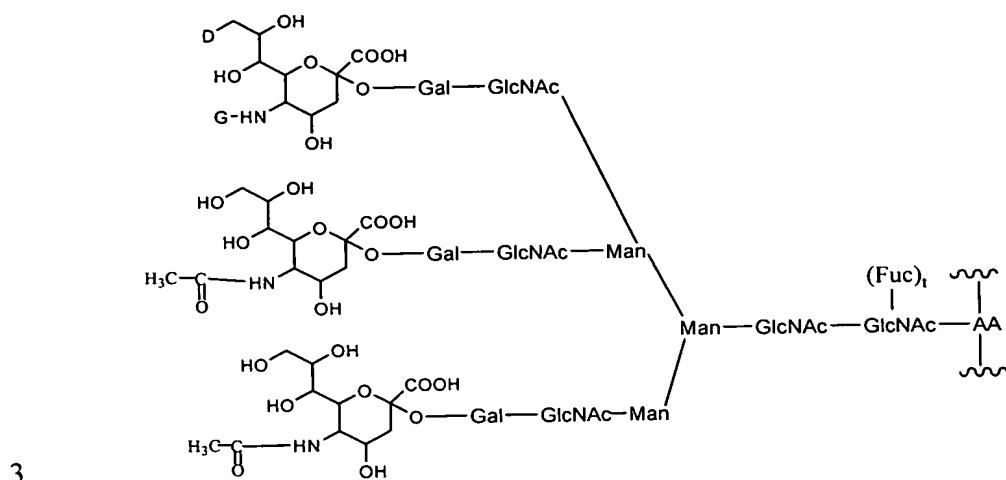
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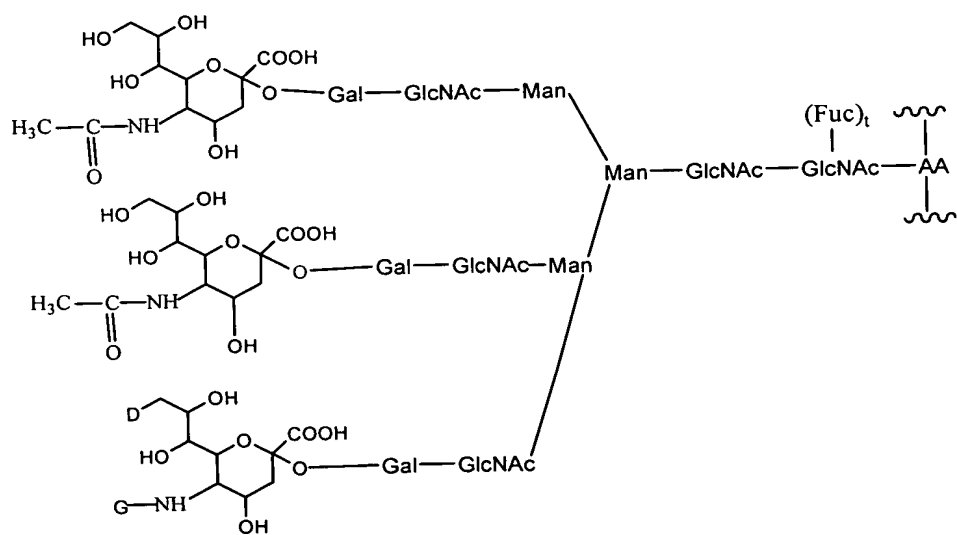
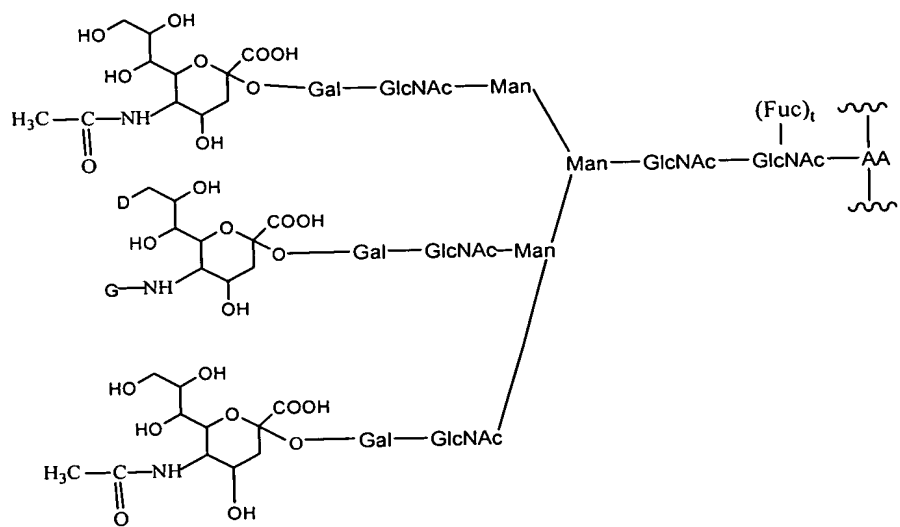
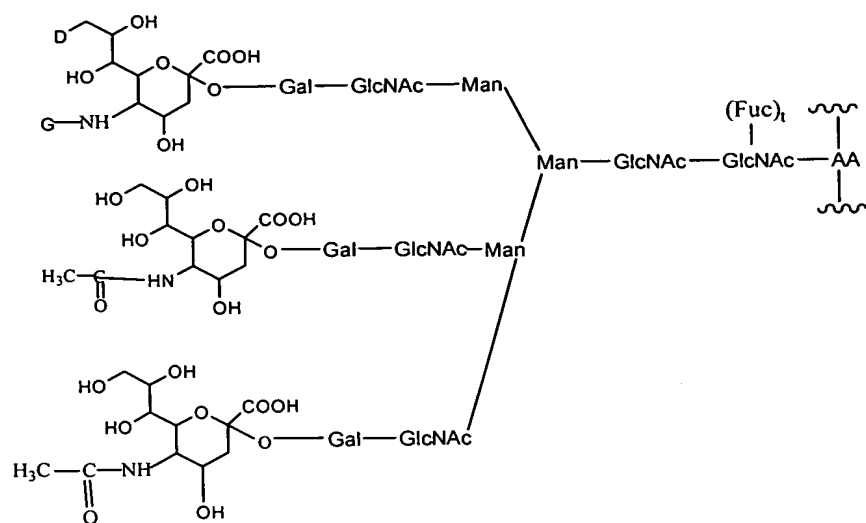
4 wherein AA is an amino acid residue of said peptide, and t is an integer equal to 0 or
5 1.

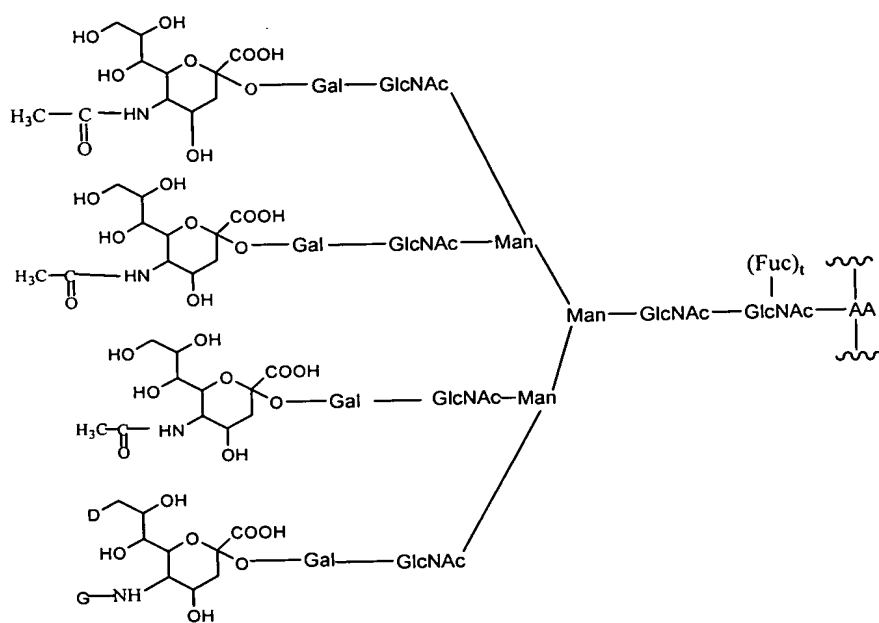
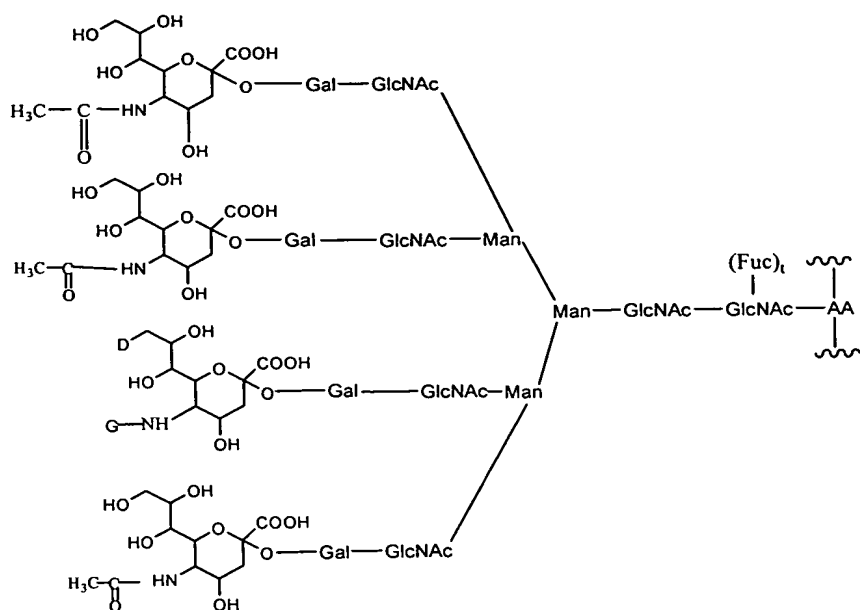
1 17. The peptide according to claim 16, wherein said amino acid residue is an
2 arginine residue.

1 18. The peptide according to claim 17, wherein said peptide has the amino acid
2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine
3 residue which is a member selected from N24, N38, N83, and combinations thereof.

- 1 19. The peptide of claim 1, wherein said peptide comprises at least one of said
 2 moiety according to a formula selected from:







7 wherein AA is an amino acid residue of said peptide, and t is an integer equal to 0
8 or 1.

1 21. The peptide according to claim 20, wherein said amino acid residue is an
2 asparagine residue.

1 22. The peptide according to claim 21, wherein said peptide has the amino acid
 2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine
 3 residue which is a member selected from N24, N38, N83, and combinations thereof.

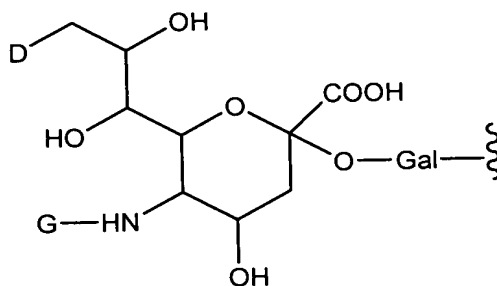
1 23. The peptide according to claim 1, wherein said peptide is a bioactive
 2 erythropoietin peptide.

1 24. The peptide according to claim 23, wherein said peptide is erythropoietically
 2 active.

1 25. The peptide according to claim 24, wherein said peptide is essentially non-
 2 erythropoietically active.

1 26. The peptide according to claim 25, wherein said peptide is tissue protective.

1 27. A method of making a PEG-ylated erythropoietin comprising the moiety:



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wherein

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R^1 is a moiety comprising straight-chain or branched poly(ethylene glycol)

5

residue; and

6

L is a linker which is a member selected from substituted or unsubstituted

7

alkyl and substituted or unsubstituted heteroalkyl,

8

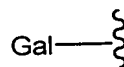
said method comprising:

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(a) contacting a substrate erythropoietin peptide comprising the

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glycosyl moiety:

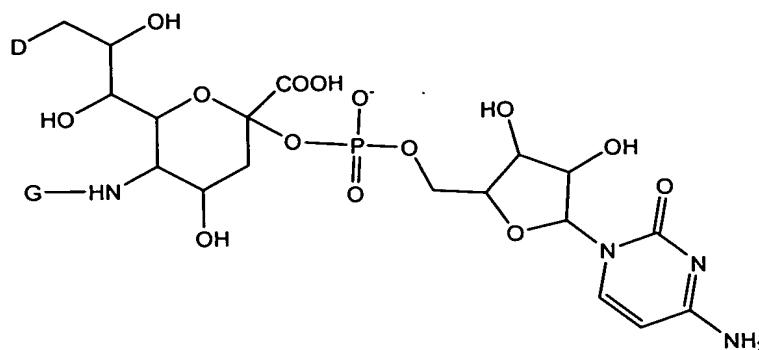


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with a PEG-sialic acid donor moiety having the formula:



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and an enzyme that transfers said PEG-sialic acid onto the Gal of said glycosyl moiety, under conditions appropriate to for said transfer.

1

28. The method of claim 27, further comprising, prior to step (a):

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(b) expressing said substrate erythropoietin peptide in a suitable host.

1

29. The method of claim 28, wherein said host is selected from an insect cell and a mammalian cell.

2

1

30. The method of claim 29, wherein said insect cell is a *Spodoptera frugiperda* cell line.

2

1

31. A method of treating a condition in a subject in need thereof, said condition characterized by compromised red blood cell production in said subject, said method comprising the step of administering to the subject an amount of a peptide according to claim 1, effective to ameliorate said condition in said subject.

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32. A method of enhancing red blood cell production in a mammal, said method comprising administering to said mammal an peptide according to claim 1.

2

1

33. A method of treating a tissue injury in a subject in need thereof, said injury characterized by damage resulting from ischemia, trauma, inflammation or contact with toxic substances, said method comprising the step of administering to the subject an amount of an erythropoietin peptide according to claim 1, effective to ameliorate the damage associated with the tissue injury in said subject.

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34. A pharmaceutical formulation comprising the erythropoietin peptide according to claim 1, and a pharmaceutically acceptable carrier.

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